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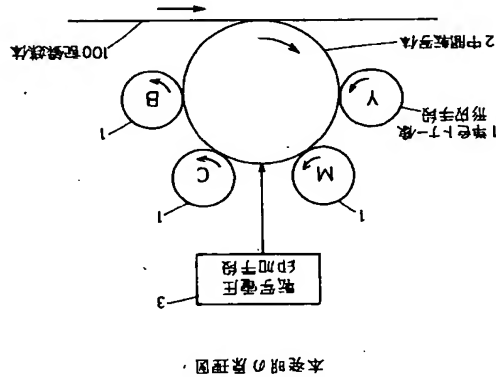
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(54)【発明の名称】 カラー電子写真装置

(57)【要約】

【目的】複色の単色トナー像を重ね合わせて中間転写体に転写した後、そのフルカラートナー像をさらに記録媒体に転写するようにしたカラー電子写真装置に関する。記録媒体にフルカラートナー像を転写する際に中間転写体に最下層のトナーの一部が残っても、簡単な構成によって、記録媒体上に色再現性の良い高品質のカラー画像を得ることができるようになることを目的とする。

【構成】中間転写体2に直接付着する最下層の単色トナー層の転写効率が、最下層以外の単色トナー層の転写効率より大きくなるように転写電圧印加手段3による印加電圧を設定して構成する。



【特許請求の範囲】

【請求項1】互いに異なる色のトナーによって各々単色のトナー像を形成する複数の単色トナー像形成手段(1)と、

上記各単色トナー像形成手段(1)から各々の単色トナー像を重ね合わせて転写され、その重ね合わされたトナー像をさらに記録媒体(100)に転写する中間転写体(2)と、

上記各単色トナー像形成手段(1)から上記中間転写体(2)に各々の単色トナー像を転写させるために上記中間転写体(2)に転写電圧を印加するための転写電圧印加手段(3)とを設けたカラー電子写真装置において、

上記単色トナー像形成手段(1)に形成されたトナー像のトナー量に対する上記中間転写体(2)に転写されるトナー像のトナー量の比率を「転写効率」としたとき、

上記中間転写体(2)に直接付着する最下層の単色トナー層の転写効率が、上記最下層以外の単色トナー層の転写効率より大きくなるように上記転写電圧印加手段(3)による印加電圧を設定したことを特徴とするカラー電子写真装置。

【請求項2】上記中間転写体(2)の表面部分は体積抵抗率が $10^8 \sim 10^{12} \Omega \cdot \text{cm}$ の導電性と弾力性のある部材によって形成されていて、上記転写電圧として600V～1200ボルトの電圧が印加されている請求項1記載のカラー電子写真装置。

【請求項3】上記転写電圧印加手段(3)による上記転写電圧が800～1000ボルトである請求項2記載のカラー電子写真装置。

【発明の詳細な説明】

【0001】
【産業上の利用分野】この発明は、複色の単色トナー像を重ね合わせて中間転写体に転写した後、そのフルカラートナー像をさらに記録媒体に転写するようにしたカラー電子写真装置に関する。

【0002】トナーによってカラー画像を表現するには、例えば黄、マゼンタ、シアンの三原色と黒の合計4色のトナー像を、重ね合わせて記録媒体に転写すればよいが、そのような重ね合わせ転写を個別体から記録媒体に直接行うのは、混色や位置ずれが起り易いため容易ではない。そこで、中間転写体を介してフルカラートナー像を転写するようにしたものがある。

【0003】

【従来の技術】そのような従来のカラー電子写真装置においては、まず画像をドットに分割して、各ドット毎に、表現しようとする色を黄、マゼンタ、シアンの4色に色分解する。そして、4つの感光ドラムの表面に、黄、マゼンタ、シアンの4色トナー像を形成して、各色を重ね合わせて中間転写体に転写（一次転写）し、次いで、中間転写体上に形成されたフルカラートナー像を記録媒体に転写（二次転写）している。

【0004】なお、上記中間転写体2の表面部分を体積抵抗率が $10^8 \sim 10^{12} \Omega \cdot \text{cm}$ の導電性と弾力性のある部材によって形成して、上記転写電圧として600～1200ボルトの電圧を印加してもよく、上記転写電圧印加手段3による上記転写電圧が800～1000ボルトであればさらに好ましい。

【0009】

【作用】複色の単色トナー層のうちのトナー層が中間転写体2に転写される。その重ね合わされたトナー像をさらに記録媒体100に転写する中間転写体2と、上記各単色トナー像を転写させるために上記中間転写体2に各々の単色トナー像を転写させるために上記中間転写体2に転写電圧を印加する手段3とを設けたカラー電子写真装置において、上記単色トナー像形成手段1に形成されたトナー像のトナー量に対する上記中間転写体2に転写されるトナー像のトナー量の比率を「転写効率」としたとき、上記中間転写体2に直接付着する最下層の単色トナー層の転写効率が、上記最下層以外の単色トナー層の転写効率より大きくなるように上記転写電圧印加手段3による印加電圧を設定したことを特徴とする。

【0008】

【0007】

【0006】

【0005】

【0004】

【0003】

【0002】

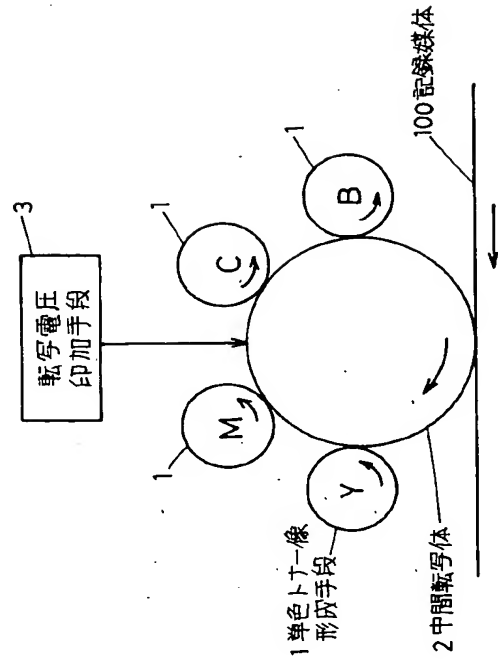
【0001】

【発明の効果】本発明のカラー電子写真装置によれば、特別な構成を必要とすることなく、転写電圧の設定によって中間転写体上に転写される最下層のトナー像のトナー量を他の層に比べて多くすることができ、その結果、記録媒体に対しては、他の層に比較して所定の適切なトナー量で最下層のトナー像が転写され、良好なフル色転写が得られる。これにより、カラー画像を得ることができる。

【図1】本発明の原理図である。
【図2】実施例の全体構成図である。
【図3】実施例の転写結果を示す線図である。
【符号の説明】
1 単色トナー像形成手段
2 中間転写ドラム (中間転写体)
3 直流電源 (転写電圧印加手段)
10 100 記録用紙 (記録媒体)

【図1】

本発明の原理図



トの転写電圧 (一次転写電圧) が印加されており、図示されている駆動データによって感光ドラム10と逆方向に回転駆動される。

【0018】したがって、中間転写ドラム2の外面と感光ドラム10の外面とは、接触部においては同方向に移動して、そこで感光ドラム10から中間転写ドラム2にトナー像が転写 (一次転写) される。なお、中間転写ドラム2の体積抵抗率は $108 \Omega \cdot \text{cm} \sim 10^{12} \Omega \cdot \text{cm}$ 程度の値が許される。

【0019】記録用紙100は、中間転写ドラム2と転写ドラム17との間に挟まれて走行し、そこで、中間転写ドラム2から記録用紙100にフルカラートナー像が転写 (二次転写) され、さらに定着器16によって、フルカラートナー像が記録用紙100に定着される。なお、二次転写電圧として2000ボルト程度の電圧が印加される。

【0020】8は、記録用紙100へトナー像を転写した後、中間転写ドラム2の表面に残った残留トナーを除くために、記録用紙100への転写部Aと次に中間転写ドラム2に新しいトナー像を転写する感光ドラム10との間に設けられた残留トナークリーナである。

【0021】このような実施例装置を用いて、一次転写電圧を200～2200ボルトの範囲で変化させて、転写効率を測定した。「転写効率」とは感光ドラム10に形成されたトナー像のトナー量 (mg/cm²) に対する、中間転写ドラム2に転写されるトナー像のトナー量 (mg/cm²) の比率、即ちトナー転写量 (mg/cm²) / トナー現象量 (mg/cm²) である。

【0022】図3はその実験結果を示しており、中間転写ドラム2に直接転写される最下層の一次色目の転写効率が二次色及び三次色目の転写効率を上回っているのは1200V以下であることから、この範囲で一次転写を行うこととし、二次転写電圧を1500～2400ボルトの範囲で行った。

【0023】二次転写においては、二次色及び三次色は転写効率が100%であるために一次転写効率のみで規定され、一次色の二次転写における転写効率が変化する。先に示した二次転写電圧では、一次色目の転写効率は70～90%の範囲となる。

【0024】これより最終的に記録用紙100上に転写されるトナーの転写効率を求めると、一次転写電圧が1000ボルトの時は一次色目が93%、二次色及び三次色目が86%で、二次転写電圧が2400ボルトの時は一次色目が90%、二次色及び三次色目が100%であったことから、一次色目の総合転写効率は84%、二次色及び三次色目が86%とほぼ同等の転写効率となっていることが判る。

【0025】これらの条件より、中間転写ドラム2における一次転写電圧の範囲は1200ボルト以下 (ただし、実用上600ボルト以上) で、転写効率より、望ましく

転写体2上で最下層になっても、最下層の単色トナー層は他の層に比べて高い転写効率で単色トナー像形成手段1からトナー像の転写を受ける。その結果、中間転写体2上では、常に最下層のトナー層だけが他の層に比較して過剰のトナー量となる。

【0010】したがって、次に中間転写体2から記録媒体100に転写される際には、最下層のトナーの一部が中間転写体2上に残ることによって、記録媒体100上において最下層のトナー量が、他の層と比較して適量になる。

【0011】
【実施例】図面を参照して実施例を説明する。図2は、黄 (Y)、マゼンタ (M)、シアン (C) 及び黒 (B) の4色のトナーを用いたカラー電子写真装置を示している。

【0012】この装置は、4色のトナーによるトナー像を形成するための4つの単色トナー像形成手段1 (1 Y, 1 M, 1 C, 1 B) と、各単色トナー像形成手段1に設けられた感光ドラム10 (10 Y, 10 M, 10 C, 10 B) に同時に接触して回転駆動される中間転写ドラム2とを有している。

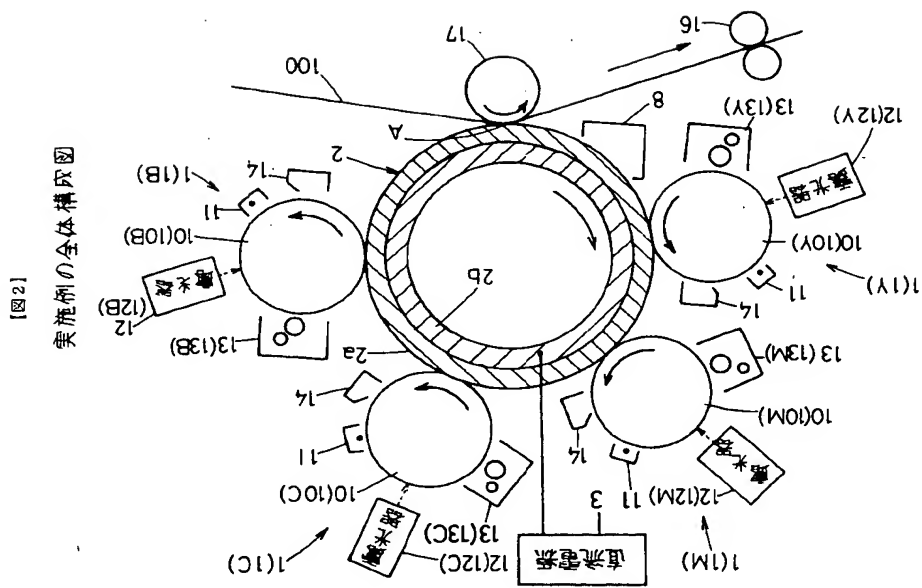
【0013】そして、下層側から黄 (Y)、マゼンタ (M)、シアン (C)、黒 (B) の順になるように、各感光ドラム10から各色のトナー像を中間転写ドラム2の外面上に重ね合わせて転写 (一次転写) した後、そのカラートナー像 (フルカラートナー像) を、中間転写ドラム2上から記録用紙100上に転写 (二次転写) するようにしている。したがって、記録用紙100上には、中間転写ドラム2上とは逆の順序で各色のトナー像が形成される。

【0014】各感光ドラム10 (10 Y, 10 M, 10 C, 10 B) の周囲には、感光ドラム10に帯電をさせるための前荷電器11、感光ドラム10に面像光を照射して静電潜像を形成する露光器12、静電潜像をトナーによって現像する現像器13が順次配列されている。中間転写ドラム2が感光ドラム10に接触することによって、感光ドラム10表面のトナー像が中間転写ドラム2に転写 (一次転写) される。

【0015】この一次転写を行わせるために、中間転写ドラム2に対して直流電源3から高電圧 (一次転写電圧) が印加されている。14は、感光ドラム10表面に残ったトナーを除去するためのクリーナである。

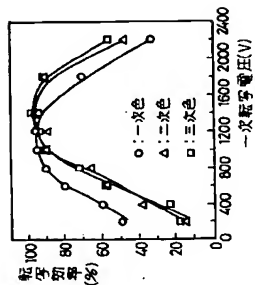
【0016】なお、露光器12及び現像器13のうち、12 Y及び13 Yは黄色トナー用、12 M及び13 Mはマゼンタトナー用、12 C及び13 Cはシアントナー用、12 B及び13 Bは黒色トナー用のものである。

【0017】中間転写ドラム2は、例えば弾力性のある体積抵抗率が $10^{10} \Omega \cdot \text{cm}$ 程度、厚さ1mmの導電性ゴム2aがアルミニウム箔2bの外側にライニングされて形成されて直流電源3によって例えば800～1000ボルト



【図3】

実施例の実験結果を示す線図



PATENT ABSTRACTS OF JAPAN

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(71)Applicant : FUJITSU LTD

(22)Date of filing : 19.07.1991

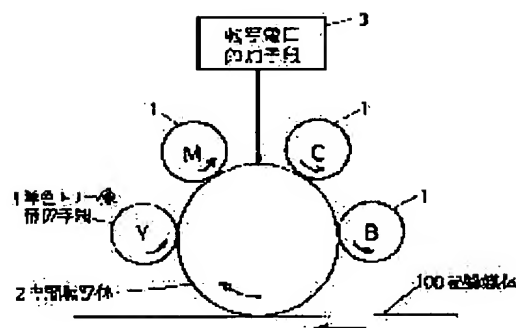
(72)Inventor : KOIKE SHUJI
ISHII AKIHIKO
SAKAI SHINO

(54) COLOR ELECTROPHOTOGRAPHIC DEVICE

(57)Abstract:

PURPOSE: To obtain a color image excellent in color reproducibility and having high quality on a recording medium even when a part of toner in a lowermost layer is left on an intermediate transfer body by controlling transfer voltage.

CONSTITUTION: When it is assumed that the ratio of the toner amount of a toner image transferred on the intermediate transfer body 2 to the toner amount of the toner image formed in a monochrome toner image forming means 1 is defined as 'transfer efficiency', impressed voltage by a transfer voltage impressing means 3 is set so that the transfer efficiency of the monochrome toner layer being the lowermost layer which directly adheres to the transfer body 2 may be larger than the transfer efficiency of the monochrome toner layer other than the lowermost layer. Therefore, the toner image is transferred on the monochrome toner layer being the lowermost layer from the monochrome toner image forming means 1 with higher transfer efficiency than that of other layer no matter whatever toner layer is the lowermost layer on the transfer body 2 among the plural monochrome toner layers. As a result, the toner amount only of the toner layer being the lowermost layer always becomes excessive in comparison with the other layer on the transfer body 2, and becomes more appropriate than the other layer in the case that it is transferred on a recording medium 100.



LEGAL STATUS

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[Date of final disposal for application]

[Patent number] 2635859

[Date of registration] 25.04.1997

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

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JAPANESE

[JP,05-027548,A]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE
INVENTION TECHNICAL PROBLEM MEANS OPERATION EXAMPLE DESCRIPTION OF
DRAWINGS DRAWINGS

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CLAIMS

[Claim(s)]

[Claim 1] Two or more monochrome toner image formation meanses to form a monochromatic toner image respectively with the toner of a mutually different color (1) The middle imprint object which each monochrome toner image piles up, is imprinted from each above-mentioned monochrome toner image formation means (1), and imprints the piled-up toner image to a record medium (100) further (2) The imprint voltage impression means for impressing imprint voltage to the above-mentioned middle imprint object (2), in order to make the above-mentioned middle imprint object (2) imprint each monochrome toner image from each above-mentioned monochrome toner image formation means (1) (3) When the ratio of the amount of toners of the toner image imprinted by the above-mentioned middle imprint object (2) over the amount of toners of the toner image which is color electrophotography equipment equipped with the above, and was formed in the above-mentioned monochrome toner image formation means (1) is made into "imprint efficiency", It is characterized by setting up the applied voltage by the above-mentioned imprint voltage impression means (3) so that the imprint efficiency of the monochrome toner layer of the lowest layer which adheres to the above-mentioned middle imprint object (2) directly may become larger than the imprint efficiency of monochrome toner layers other than the above-mentioned lowest layer.

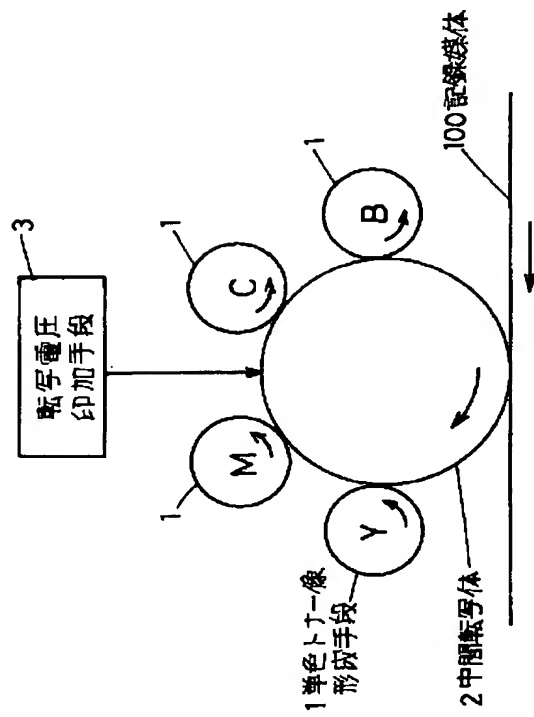
[Claim 2] The surface portion of the above-mentioned middle imprint object (2) is color electrophotography equipment according to claim 1 with which the volume resistivity is formed of the member with the conductivity of $10^8 - 10^{12}$ ohm-cm, and elasticity, and the voltage of 600-1200 volts is impressed as the above-mentioned imprint voltage.

[Claim 3] Color electrophotography equipment according to claim 2 whose above-mentioned imprint voltage by the above-mentioned imprint voltage impression means (3) is 800-1000 volts.

[Translation done.]

Drawing selection [Representative drawing] ☒

本発明の原理図



[Translation done.]

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[JP,05-027548,A]

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INVENTION TECHNICAL PROBLEM MEANS OPERATION EXAMPLE DESCRIPTION OF
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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] After this invention piles up the monochrome toner image of two or more colors and imprints it on a middle imprint object, it relates to the color electrophotography equipment which imprinted the full color toner image to the record medium further.

[0002] Although what is necessary is to make yellow, a Magenta, and the toner image of the three primary colors of cyanogen, and a total of four black colors pile up mutually, and just to imprint them to a record medium, in order to express a color picture with a toner, since color mixture and a position gap tend to take place, it is not easy to perform such a superposition imprint to a record medium directly from a photo conductor. Then, there are some which imprinted the full color toner image through the middle imprint object.

[0003]

[Description of the Prior Art] In such conventional color electrophotography equipment, first, a picture is divided into a dot and the color of the color which it is going to express is separated into four colors of yellow, a Magenta, cyanogen, and black for every dot. And yellow, a Magenta, cyanogen, and a black monochrome toner image are formed in the front face of four photoconductor drums, and each color is piled up, it imprints on a middle imprint object (primary imprint), and, subsequently to a middle imprint object top, the formed full color toner image is imprinted to the record medium (secondary imprint).

[0004]

[Problem(s) to be Solved by the Invention] However, in case a secondary imprint is performed from a middle imprint object to a record medium, a part of the toner adheres to a middle imprint object, and the toner layer of the lowest layer which touches the middle imprint object directly remains on a middle imprint object. Therefore, by the full color toner image on a record medium, the color component of the lowest layer (a record-medium top the best layer) becomes weak, and an exact color is no longer reproduced.

[0005] In case for example, a monochrome toner image is formed there, a means by which only the color which becomes the lowest layer on a middle imprint object increases light exposure, and increases the amount of toners of the layer is also considered. However, in order to perform this since it has not become settled which color becomes the lowest layer in case a full color toner image is formed, it is necessary to read the portion which serves as the lowest layer further after color separation, and to record on memory as image information. Therefore, an image memory becomes huge, and control becomes difficult, and also many faults, like the price of equipment becomes high and process speed also becomes slow arise.

[0006] Then, this invention aims at offering the color electrophotography equipment which can obtain the good quality color picture of color-reproduction nature on a record medium by easy composition, even if a part of toner of the lowest layer remains in a middle imprint object, in case a full color toner image is imprinted to a record medium.

[0007]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, the middle imprint object of the electrophotography equipment of this invention Two or more monochrome toner image formation meanses 1 to form a monochromatic toner image respectively with the toner of a mutually different color as shown in drawing 1 , The middle imprint object 2 which each monochrome toner image piles up, is imprinted from each above-mentioned monochrome toner image formation means 1, and imprints the piled-up toner image to a record medium 100 further, In the color electrophotography equipment which established the imprint voltage impression means 3 for impressing imprint voltage to the above-mentioned middle imprint object 2 in order to make the above-mentioned middle imprint object 2 imprint each monochrome toner image from each above-mentioned monochrome toner image formation means 1 When the ratio of the amount of toners of the toner image imprinted by the above-mentioned middle imprint object 2 over the amount of toners of the toner image formed in the above-mentioned monochrome toner image formation means 1 is made into "imprint efficiency", It is characterized by setting up the applied voltage by the above-mentioned imprint voltage impression means 3 so that the imprint efficiency of the monochrome toner layer of the lowest layer which adheres to the above-mentioned middle imprint object 2 directly may become larger than the imprint efficiency of monochrome toner layers other than the above-mentioned lowest layer.

[0008] In addition, a volume resistivity may form the surface portion of the above-mentioned middle imprint object 2 by the member with the conductivity of $10^8 - 10^{12}$ ohm-cm, and elasticity, and the voltage of 600-1200v may be impressed as the above-mentioned imprint voltage, and it is still more desirable if the above-mentioned imprint voltage by the above-mentioned imprint voltage impression means 3 is 800-1000v.

[0009]

[Function] Even if which toner layer turns into the lowest layer on the middle imprint object 2 among two or more monochrome toner layers, the monochrome toner layer of the lowest layer receives the imprint of a toner image from the monochrome toner image formation means 1 at high imprint efficiency compared with other layers. Consequently, on the middle imprint object 2, only the toner layer of the lowest layer always serves as the superfluous amount of toners as compared with other layers.

[0010] Therefore, in case a record medium 100 next imprints from the middle imprint object 2, when a part of toner of the lowest layer remains on the middle imprint object 2, the amount of toners of the lowest layer turns into a suitable amount on a record medium 100 as compared with other layers.

[0011]

[Example] An example is explained with reference to a drawing. Drawing 2 shows the color electrophotography equipment which used the toner of four colors of yellow (Y), a Magenta (M), cyanogen (C), and black (B).

[0012] This equipment has four monochrome toner image formation meanses 1 (1Y, 1M, 1C, 1B) for forming the toner image by the toner of four colors, and the middle imprint drum 2 by which contacts simultaneously the photoconductor drum 10 (10Y, 10M, 10C, 10B) prepared in each monochrome toner image formation means 1, and a rotation drive is carried out.

[0013] And after piling up and imprinting the toner image of each color on the peripheral face of the middle imprint drum 2 from each photoconductor drum 10 so that it may become the order of yellow (Y), a Magenta (M), cyanogen (C), and black (B) from a lower layer side (primary imprint), the color toner image (full color toner image) is imprinted on the record form 100 from on the middle imprint drum 2 (secondary imprint). Therefore, on the record form 100, the toner image of each color is formed by the reverse order with the middle imprint drum 2 top.

[0014] Around each photoconductor drum 10 (10Y, 10M, 10C, 10B) The precingulum electrical machinery 11 for electrifying a photoconductor drum 10, the photographic filter 12 which

irradiates picture light and forms an electrostatic latent image in a photoconductor drum 10, and the development counter 13 which develops an electrostatic latent image with a toner are arranged one by one. When the middle imprint drum 2 contacts a photoconductor drum 10, the toner image of photoconductor drum 10 front face is imprinted by the middle imprint drum 2 (primary imprint).

[0015] In order to make this primary imprint perform, the high voltage (primary imprint voltage) is impressed from DC power supply 3 to the middle imprint drum 2. 14 is a cleaner for removing the toner which remained in photoconductor drum 10 front face.

[0016] In addition, for the object for yellow toners, and 12M and 13M, the object for cyano toners, and 12B and 13B of the object for Magenta toners, and 12C and 13C are [12Y and 13Y] for black toners among a photographic filter 12 and a development counter 13.

[0017] With a thickness of 1mm conductive rubber 2a is lined by the outside of aluminum element tube 2b by 1010 ohm-cm, it is formed, the imprint voltage (primary imprint voltage) of 800-1000v is impressed by DC power supply 3, and the rotation drive of the volume resistivity in which the middle imprint drum 2 is elastic is carried out by the drive motor which is not illustrated at a photoconductor drum 10 and an opposite direction.

[0018] Therefore, the peripheral face of the middle imprint drum 2 and the peripheral face of a photoconductor drum 10 move in this direction in the contact section, and a toner image is imprinted by the middle imprint drum 2 from a photoconductor drum 10 there (primary imprint). In addition, the volume resistivity of the middle imprint drum 2 is 108. About [ω -cm -1012 ohm-cm] width of face is permitted.

[0019] The record form 100 is inserted between the middle imprint drum 2 and the imprint roller 17, and runs, a full color toner image is imprinted by the record form 100 from the middle imprint drum 2 (secondary imprint), and the record form 100 is further fixed to a full color toner image by the fixing assembly 16 there. In addition, the voltage of about 2000v is impressed as secondary imprint voltage.

[0020] 8 is the remains toner cleaner formed between the imprint section A to the record form 100, and the photoconductor drum 10 which imprints a new toner image to the middle imprint drum 2 at a degree, in order to remove the remains toner which remained in the front face of the middle imprint drum 2, after imprinting a toner image to the record form 100.

[0021] Using such example equipment, primary imprint voltage was changed in 200-2200v, and imprint efficiency was measured. "Imprint efficiency" is the ratio of the amount of toners (mg/cm²) of the toner image imprinted by the middle imprint drum 2 to the amount of toners of the toner image formed in the photoconductor drum 10 (mg/cm²), i.e., the amount of toner imprints (mg/cm²) / the amount of toner developments, (mg/cm²).

[0022] The experimental result was shown, since it was less than [1200V], that the imprint efficiency of the primary amorous glance of the lowest layer directly imprinted by the middle imprint drum 2 has exceeded the imprint efficiency of a secondary color and a Miyoshi amorous glance decided to perform a primary imprint in this range, and, as for drawing 3 , it performed secondary imprint voltage in 1500-2400v.

[0023] In a secondary imprint, since imprint efficiency is 100%, a secondary color and the Miyoshi color are prescribed by only primary imprint efficiency, and the imprint efficiency in the secondary imprint of a primary color changes. On the secondary imprint voltage shown previously, the imprint efficiency of a primary amorous glance serves as 70 - 90% of range.

[0024] When the imprint efficiency of the toner more finally than this imprinted on the record form 100 is searched for and primary imprint voltage is 1000 volts, a primary amorous glance is [93%, a secondary color, and a Miyoshi amorous glance] 86%. Since a primary amorous glance was [90%, a secondary color, and a Miyoshi amorous glance] 100% when secondary imprint voltage was 2400 volts, it turns out that the comprehensive imprint efficiency of a primary amorous glance is the imprint efficiency in which a secondary color and a Miyoshi amorous glance are almost equivalent to 86%, 84%.

[0025] The range of primary imprint voltage [in / the middle imprint drum 2 / from these conditions] is 1200v or less (however practically 600v or more), and the range of it is 800-1000v more desirably than imprint efficiency. Thereby, it was checked that the color toner picture established after the secondary imprint is a desired color.

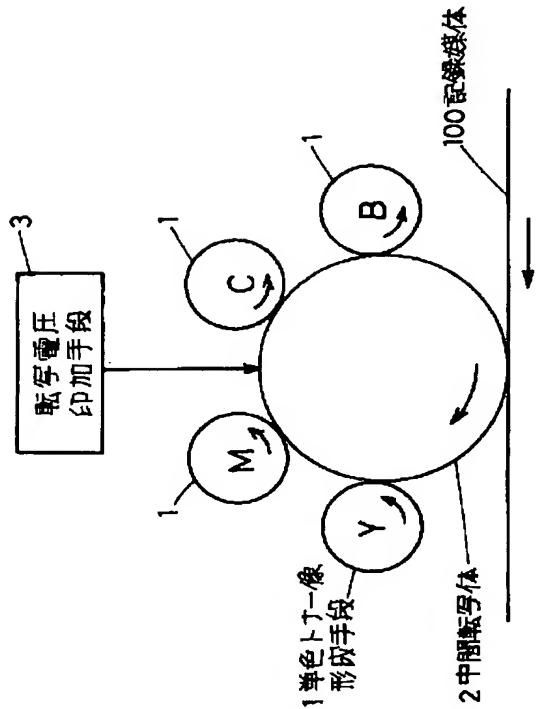
[0026]

[Effect of the Invention] According to the color electrophotography equipment of this invention, without needing special composition, only the amount of toners of the toner image of the lowest layer imprinted by setup of imprint voltage on a middle imprint object can be made [many] compared with other layers, consequently the toner image of the lowest layer is imprinted in the suitable predetermined amount of toners to a record medium as compared with other layers, and a good full color picture can be acquired.

[Translation done.]

Drawing selection [Representativ drawing] 

本発明の原理図



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[JP,05-027548,A]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE
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TECHNICAL FIELD

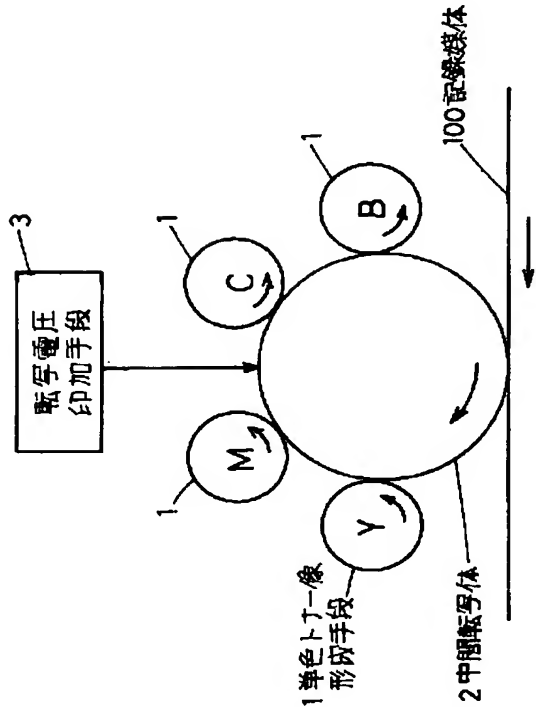
[Industrial Application] After this invention piles up the monochrome toner image of two or more colors and imprints it on a middle imprint object, it relates to the color electrophotography equipment which imprinted the full color toner image to the record medium further.

[0002] Although what is necessary is to make yellow, a Magenta, and the toner image of the three primary colors of cyanogen, and a total of four black colors pile up mutually, and just to imprint them to a record medium, in order to express a color picture with a toner, since color mixture and a position gap tend to take place, it is not easy to perform such a superposition imprint to a record medium directly from a photo conductor. Then, there are some which imprinted the full color toner image through the middle imprint object.

[Translation done.]

Drawing selection [Representativ drawing] ☐

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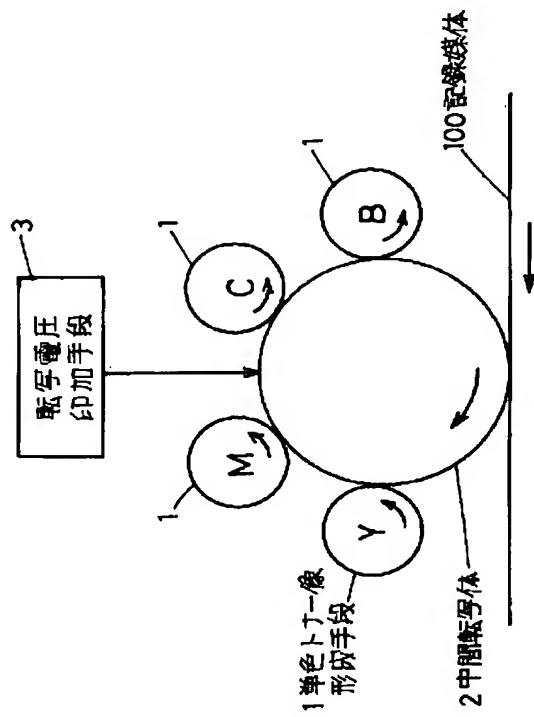
PRIOR ART

[Description of the Prior Art] In such conventional color electrophotography equipment, first, a picture is divided into a dot and the color of the color which it is going to express is separated into four colors of yellow, a Magenta, cyanogen, and black for every dot. And yellow, a Magenta, cyanogen, and a black monochrome toner image are formed in the front face of four photoconductor drums, and each color is piled up, it imprints on a middle imprint object (primary imprint), and, subsequently to a middle imprint object top, the formed full color toner image is imprinted to the record medium (secondary imprint).

[Translation done.]

Drawing selection [Repr sentative drawing] 

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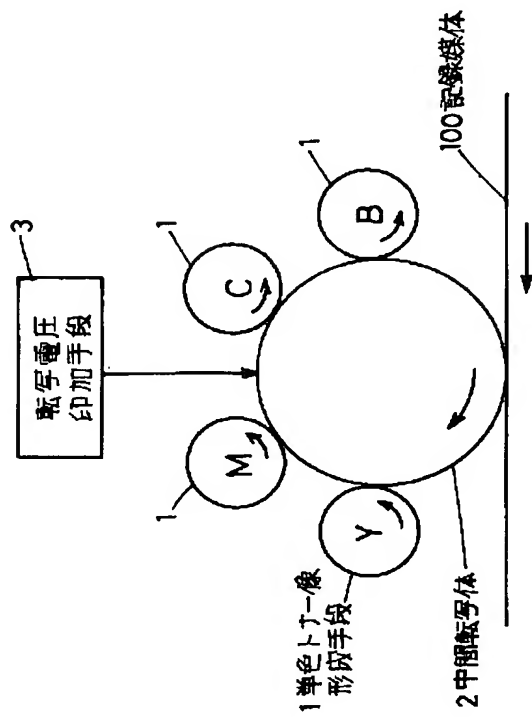
EFFECT OF THE INVENTION

[Effect of the Invention] According to the color electrophotography equipment of this invention, without needing special composition, only the amount of toners of the toner image of the lowest layer imprinted by setup of imprint voltage on a middle imprint object can be made [many] compared with other layers, consequently the toner image of the lowest layer is imprinted in the suitable predetermined amount of toners to a record medium as compared with other layers, and a good full color picture can be acquired.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, in case a secondary imprint is performed from a middle imprint object to a record medium, a part of the toner adheres to a middle imprint object, and the toner layer of the lowest layer which touches the middle imprint object directly remains on a middle imprint object. Therefore, by the full color toner image on a record medium, the color component of the lowest layer (a record-medium top the best layer) becomes weak, and an exact color is no longer reproduced.

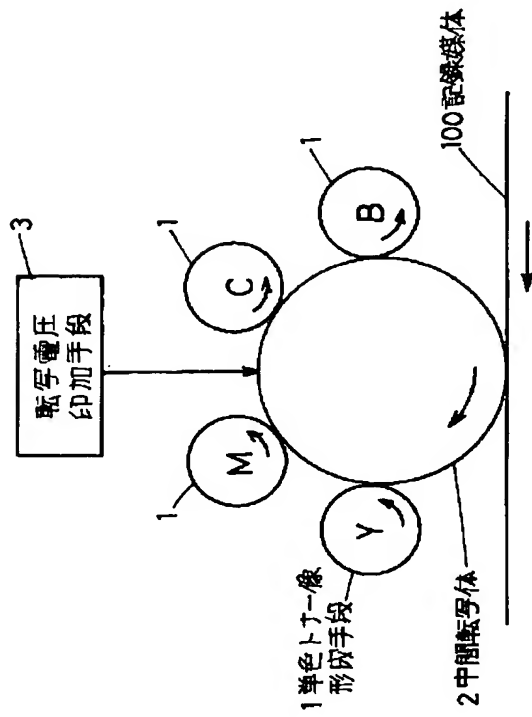
[0005] In case for example, a monochrome toner image is formed there, a means by which only the color which becomes the lowest layer on a middle imprint object increases light exposure, and increases the amount of toners of the layer is also considered. However, in order to perform this since it has not become settled which color becomes the lowest layer in case a full color toner image is formed, it is necessary to read the portion which serves as the lowest layer further after color separation, and to record on memory as image information. Therefore, an image memory becomes huge, and control becomes difficult, and also many faults, like the price of equipment becomes high and process speed also becomes slow arise.

[0006] Then, this invention aims at offering the color electrophotography equipment which can obtain the good quality color picture of color-reproduction nature on a record medium by easy composition, even if a part of toner of the lowest layer remains in a middle imprint object, in case a full color toner image is imprinted to a record medium.

[Translation done.]

Drawing selection [Representative drawing] 

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MEANS

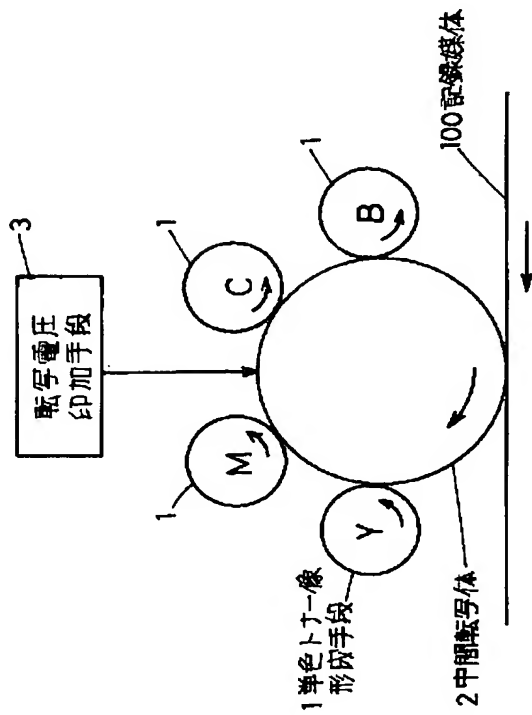
[Means for Solving the Problem] In order to attain the above-mentioned purpose, the middle imprint object of the electrophotography equipment of this invention Two or more monochrome toner image formation meanses 1 to form a monochromatic toner image respectively with the toner of a mutually different color as shown in drawing 1 , The middle imprint object 2 which each monochrome toner image piles up, is imprinted from each above-mentioned monochrome toner image formation means 1, and imprints the piled-up toner image to a record medium 100 further, In the color electrophotography equipment which established the imprint voltage impression means 3 for impressing imprint voltage to the above-mentioned middle imprint object 2 in order to make the above-mentioned middle imprint object 2 imprint each monochrome toner image from each above-mentioned monochrome toner image formation means 1 When the ratio of the amount of toners of the toner image imprinted by the above-mentioned middle imprint object 2 over the amount of toners of the toner image formed in the above-mentioned monochrome toner image formation means 1 is made into "imprint efficiency", It is characterized by setting up the applied voltage by the above-mentioned imprint voltage impression means 3 so that the imprint efficiency of the monochrome toner layer of the lowest layer which adheres to the above-mentioned middle imprint object 2 directly may become larger than the imprint efficiency of monochrome toner layers other than the above-mentioned lowest layer.

[0008] In addition, a volume resistivity may form the surface portion of the above-mentioned middle imprint object 2 by the member with the conductivity of $10^8 - 10^{12}$ ohm-cm, and elasticity, and the voltage of 600-1200 volts may be impressed as the above-mentioned imprint voltage, and it is still more desirable if the above-mentioned imprint voltage by the above-mentioned imprint voltage impression means 3 is 800-1000 volts.

[Translation done.]

Drawing selection [Repr sentativ drawing] 

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OPERATION

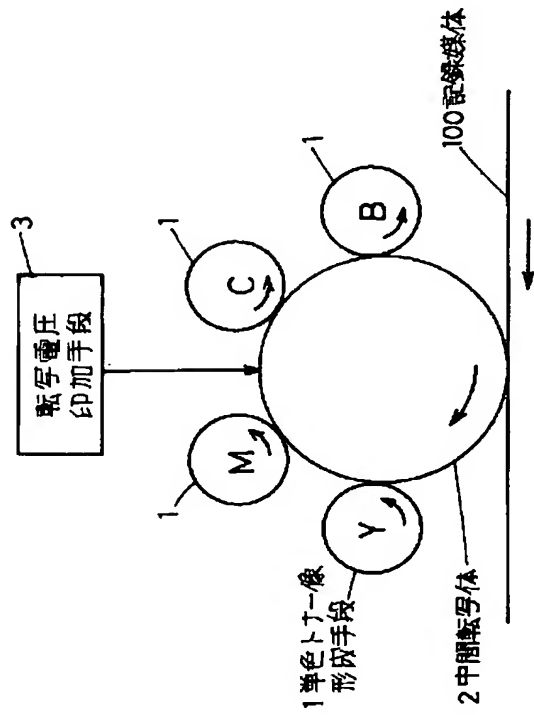
[Function] Even if which toner layer turns into the lowest layer on the middle imprint object 2 among two or more monochrome toner layers, the monochrome toner layer of the lowest layer receives the imprint of a toner image from the monochrome toner image formation means 1 at high imprint efficiency compared with other layers. Consequently, on the middle imprint object 2, only the toner layer of the lowest layer always serves as the superfluous amount of toners as compared with other layers.

[0010] Therefore, in case a record medium 100 next imprints from the middle imprint object 2, when a part of toner of the lowest layer remains on the middle imprint object 2, the amount of toners of the lowest layer turns into a suitable amount on a record medium 100 as compared with other layers.

[Translation done.]

Drawing selection [Repr sentativ drawing] 

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EXAMPLE

[Example] An example is explained with reference to a drawing. Drawing 2 shows the color electrophotography equipment which used the toner of four colors of yellow (Y), a Magenta (M), cyanogen (C), and black (B).

[0012] This equipment has four monochrome toner image formation meanses 1 (1Y, 1M, 1C, 1B) for forming the toner image by the toner of four colors, and the middle imprint drum 2 by which contacts simultaneously the photoconductor drum 10 (10Y, 10M, 10C, 10B) prepared in each monochrome toner image formation means 1, and a rotation drive is carried out.

[0013] And after piling up and imprinting the toner image of each color on the peripheral face of the middle imprint drum 2 from each photoconductor drum 10 so that it may become the order of yellow (Y), a Magenta (M), cyanogen (C), and black (B) from a lower layer side (primary imprint), the color toner image (full color toner image) is imprinted on the record form 100 from on the middle imprint drum 2 (secondary imprint). Therefore, on the record form 100, the toner image of each color is formed by the reverse order with the middle imprint drum 2 top.

[0014] Around each photoconductor drum 10 (10Y, 10M, 10C, 10B) The precingulum electrical machinery 11 for electrifying a photoconductor drum 10, the photographic filter 12 which irradiates picture light and forms an electrostatic latent image in a photoconductor drum 10, and the development counter 13 which develops an electrostatic latent image with a toner are arranged one by one. When the middle imprint drum 2 contacts a photoconductor drum 10, the toner image of photoconductor drum 10 front face is imprinted by the middle imprint drum 2 (primary imprint).

[0015] In order to make this primary imprint perform, the high voltage (primary imprint voltage) is impressed from DC power supply 3 to the middle imprint drum 2. 14 is a cleaner for removing the toner which remained in photoconductor drum 10 front face.

[0016] In addition, for the object for yellow toners, and 12M and 13M, the object for cyano toners, and 12B and 13B of the object for Magenta toners, and 12C and 13C are [12Y and 13Y] for black toners among a photographic filter 12 and a development counter 13.

[0017] With a thickness of 1mm conductive rubber 2a is lined by the outside of aluminum element tube 2b by 1010 ohm-cm, it is formed, the imprint voltage (primary imprint voltage) of 800-1000 volts is impressed by DC power supply 3, and the rotation drive of the volume resistivity in which the middle imprint drum 2 is elastic is carried out by the drive motor which is not illustrated at a photoconductor drum 10 and an opposite direction.

[0018] Therefore, the peripheral face of the middle imprint drum 2 and the peripheral face of a photoconductor drum 10 move in this direction in the contact section, and a toner image is imprinted by the middle imprint drum 2 from a photoconductor drum 10 there (primary imprint). In addition, the volume resistivity of the middle imprint drum 2 is 10⁸. About [omega-cm -10¹² ohm-cm] width of face is permitted.

[0019] The record form 100 is inserted between the middle imprint drum 2 and the imprint roller 17, and runs, a full color toner image is imprinted by the record form 100 from the middle imprint

drum 2 (secondary imprint), and the record form 100 is further fixed to a full color toner image by the fixing assembly 16 there. In addition, the voltage of about 2000 volts is impressed as secondary imprint voltage.

[0020] 8 is the remains toner cleaner formed between the imprint section A to the record form 100, and the photoconductor drum 10 which imprints a new toner image to the middle imprint drum 2 at a degree, in order to remove the remains toner which remained in the front face of the middle imprint drum 2, after imprinting a toner image to the record form 100.

[0021] Using such example equipment, primary imprint voltage was changed in 200–2200 volts, and imprint efficiency was measured. "Imprint efficiency" is the ratio of the amount of toners (mg/cm²) of the toner image imprinted by the middle imprint drum 2 to the amount of toners of the toner image formed in the photoconductor drum 10 (mg/cm²), i.e., the amount of toner imprints (mg/cm²) / the amount of toner developments, (mg/cm²).

[0022] The experimental result was shown, since it was less than [1200V], that the imprint efficiency of the primary amorous glance of the lowest layer directly imprinted by the middle imprint drum 2 has exceeded the imprint efficiency of a secondary color and a Miyoshi amorous glance decided to perform a primary imprint in this range, and, as for drawing 3 , it performed secondary imprint voltage in 1500–2400 volts.

[0023] In a secondary imprint, since imprint efficiency is 100%, a secondary color and the Miyoshi color are prescribed by only primary imprint efficiency, and the imprint efficiency in the secondary imprint of a primary color changes. On the secondary imprint voltage shown previously, the imprint efficiency of a primary amorous glance serves as 70 – 90% of range.

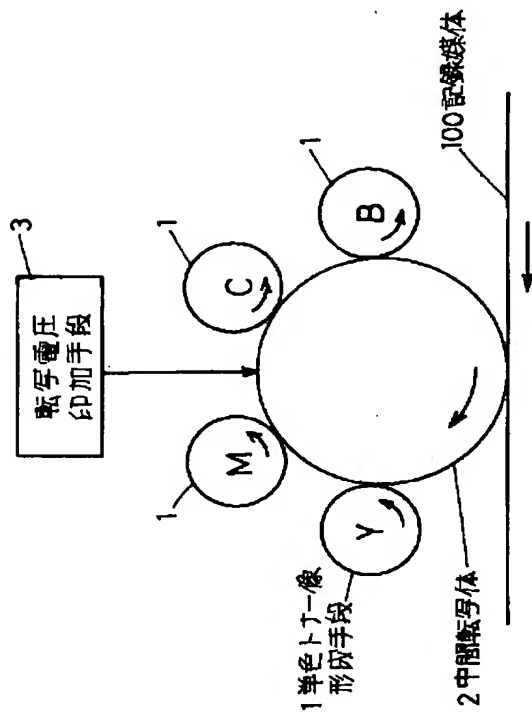
[0024] When the imprint efficiency of the toner more finally than this imprinted on the record form 100 is searched for and primary imprint voltage is 1000 volts, a primary amorous glance is [93%, a secondary color, and a Miyoshi amorous glance] 86%. Since a primary amorous glance was [90%, a secondary color, and a Miyoshi amorous glance] 100% when secondary imprint voltage was 2400 volts, it turns out that the comprehensive imprint efficiency of a primary amorous glance is the imprint efficiency in which a secondary color and a Miyoshi amorous glance are almost equivalent to 86%, 84%.

[0025] The range of primary imprint voltage [in / the middle imprint drum 2 / from these conditions] is 1200 volts or less (however practically 600 volts or more), and the range of it is 800–1000 volts more desirably than imprint efficiency. Thereby, it was checked that the color toner picture established after the secondary imprint is a desired color.

[Translation done.]

Drawing selection [Representativ drawing] 

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the principle view of this invention.

[Drawing 2] It is the whole example block diagram.

[Drawing 3] It is the diagram showing the experimental result of an example.

[Description of Notations]

1 Monochrome Toner Image Formation Means

2 Middle Imprint Drum (Middle Imprint Object)

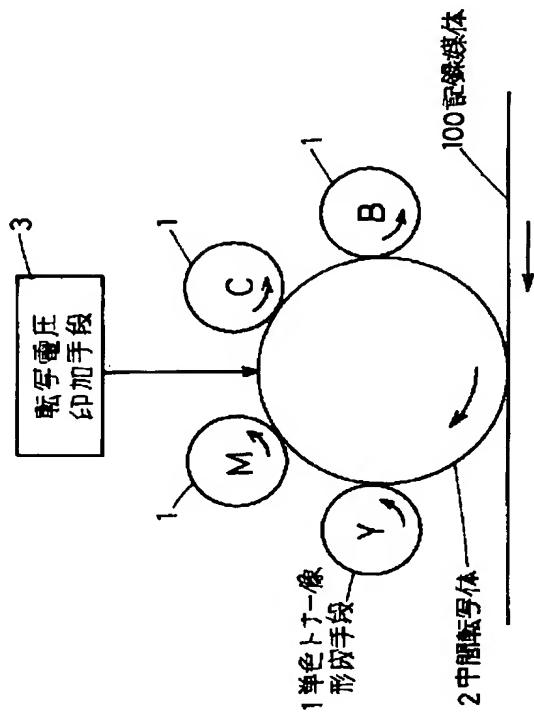
3 DC Power Supply (Imprint Voltage Impression Means)

100 Record Form (Record Medium)

[Translation done.]

Drawing selection [Representative drawing] 

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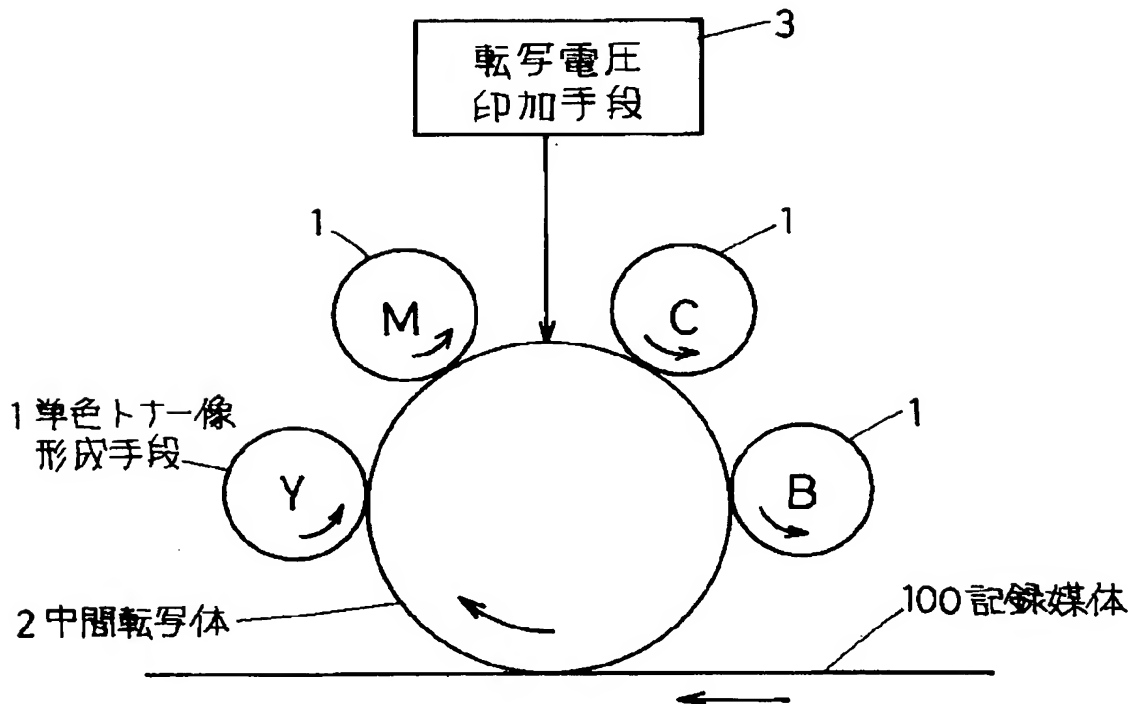
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DRAWINGS

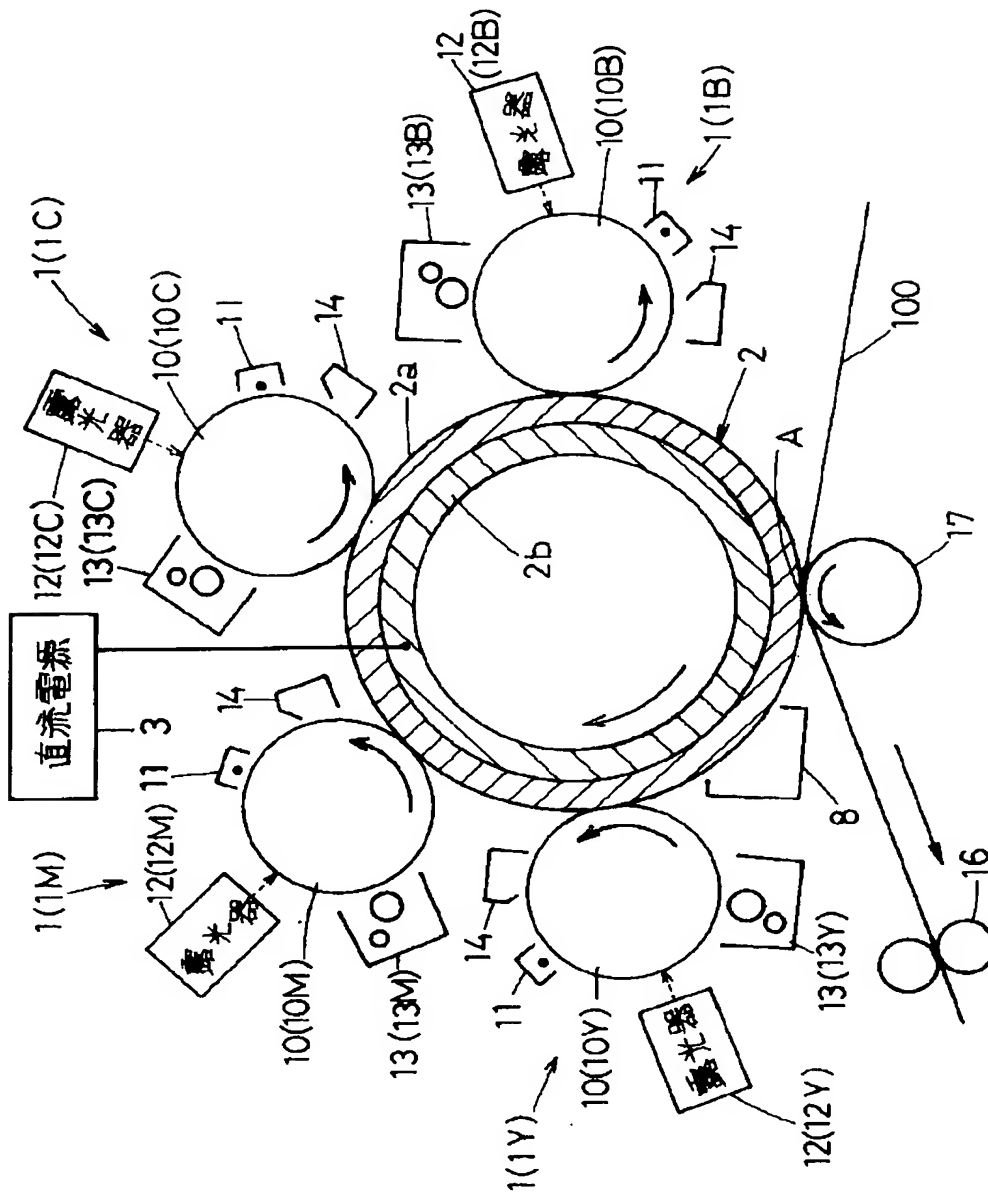
[Drawing 1]

本発明の原理図



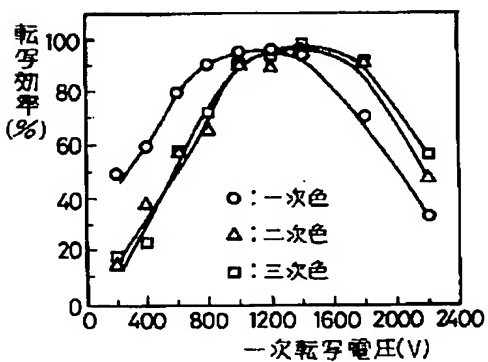
[Drawing 2]

実施例の全体構成図



[Drawing 3]

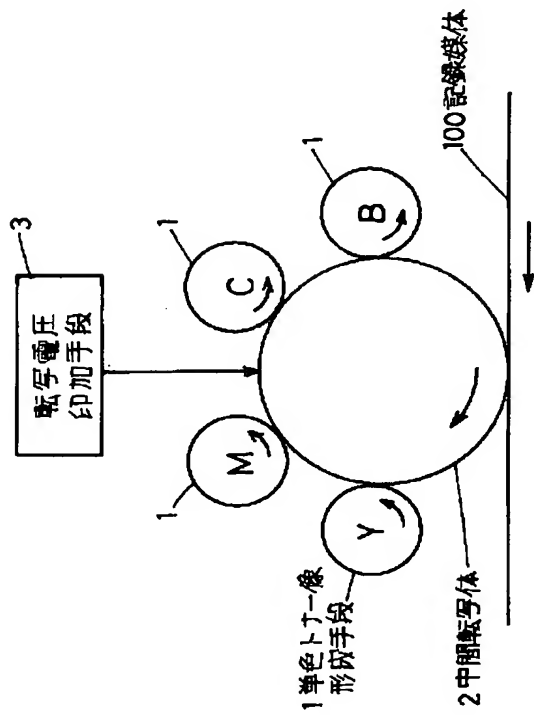
実施例の実験結果を示す線図



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